

REMARKS/ARGUMENTS

The above-identified patent application has been amended and reconsideration and re-examination are hereby requested.

The specification has been amended to correct errors pointed out by the Examiner.

Proposed drawings changes with corrections indicated in red are enclosed. Approval is hereby requested.

Applicants have discovered that while both the upstream sensor and the downstream sensor have time histories with both first transitions varying between a lean air-fuel ratio signal level and a rich air-fuel ratio signal level and second transitions varying between a rich air-fuel ratio signal level and a lean air-fuel ratio signal level, a more reliable measure of the performance of the catalyst can be determined using only the first transitions varying between a lean air-fuel ratio signal level and a rich air-fuel ratio signal level rather than using the second transitions varying between a rich air-fuel ratio signal level and a lean air-fuel ratio signal level.

As pointed out in the patent application:

Referring to FIG. 5, shows statistical distributions differences between the measured average lean to rich (L/R) transition phase shift (70) and rich to lean R/L transition phase shift (72) for a catalytic converter having low emissions conversion effectiveness, determined by using time delay measurements during lean to rich or rich to lean, transitions of the upstream and downstream oxygen sensors.

It is noted that there is less measurement deviation when using the time delay measurements between during lean to rich transitions of the upstream and downstream oxygen sensors, curve 70, than that using the time delay measurements between rich to lean transitions, curve 72. Further, there are statistically less MIL indications less when using the time delay measurements between during lean to lean [sic] transitions of the upstream and downstream oxygen sensors, curve 70, than that using the time delay measurements between rich to rich [sic] transitions, curve 72.

It is respectfully submitted that this is an unexpected result not recognized in the cited art.

Thus, considering claim 1, such claim has been amended to point out that the method includes determining a time delay between only the first transitions in the upstream time

history and the downstream time history.

It is respectfully submitted that Kawamura (U. S. Patent No. 5,644,912) does not use only the first transitions in such time histories but rather uses **BOTH** the first transitions and the second transitions and fails to appreciate or recognize the advantage of using only the first transitions in such time histories from the lean air-fuel ratio signal level to the rich air-fuel ratio signal level.

Claim 4 has been amended to point out that the method includes:

generating a first signal indicative of an exhaust gas air fuel ratio relative to stoichiometry upstream of the converter, such first signal having first transitions when the first signal varies between a lean air-fuel ratio signal level and a rich air-fuel ratio signal level and having second transitions when the first signal varies between a rich air-fuel ratio signal level and a lean air-fuel ratio signal level;

generating a second signal indicative of an exhaust gas air fuel ratio relative to stoichiometry downstream of the converter, such second signal having a first transition when the second signal varies between a lean air-fuel ratio signal level and a rich air-fuel ratio signal level and second transition when the second signal varies between a rich air-fuel ratio signal level and a lean air-fuel ratio signal level;

determining a first time when the first signal has a first transition from a lean to rich air fuel ratio relative stoichiometry;

determining a second time when the second signal has a first transitions from a lean to rich air fuel ratio relative stoichiometry;

determining a catalyst operating efficiency based on the difference between the first and second times, ***such determining being independent of a time delay between the second transition of the first signal and the second transition of the second signal.*** (emphasis added).

It is respectfully submitted that Kawamura (U. S. Patent No. 5,644,912) does determine, appreciate or recognize the advantage of determining catalyst operating efficiency ***independent of a time delay between the second transition of the first signal and the second transition of the second signal.***

New claims 6 and 7 have similar limitations. i.e., determining catalyst operating efficiency ***independent of a time delay between the second transition of the first signal and the second transition of the second signal.***

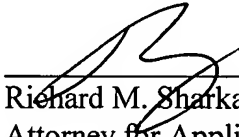
The Examiner is respectfully invited to telephone the undersigning attorney if there are any questions regarding this Amendment or this application.

The Assistant Commissioner is hereby authorized to charge payment of any additional fees associated with this communication or credit any overpayment to Deposit Account No. 500845.

Respectfully submitted,

Date

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